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Five Species of the Genus *Liacarus* Michael (Acari: Liacaridae).
Taxonomic Notes on Oribatid Mites of Hokkaido. III

With 15 Text-figures

Tokuko FUJIKAWA

Institute of Zoology, Faculty of Agriculture, Hokkaido University, Sapporo 060, Japan

and

Jun-ichi AOKI

Department of Zoology, National Science Museum, Tokyo 110, Japan

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ABSTRACT The present paper deals with five species of the genus *Liacarus* found in Hokkaido. Three of them are considered to be new species and described in this paper as *L. clavatus*, *L. yezoensis* and *L. bacillatus*. The remaining two species, *L. acutidens* Aoki and *L. contiguus* Aoki, which were described from central Japan, are newly reported from Hokkaido.

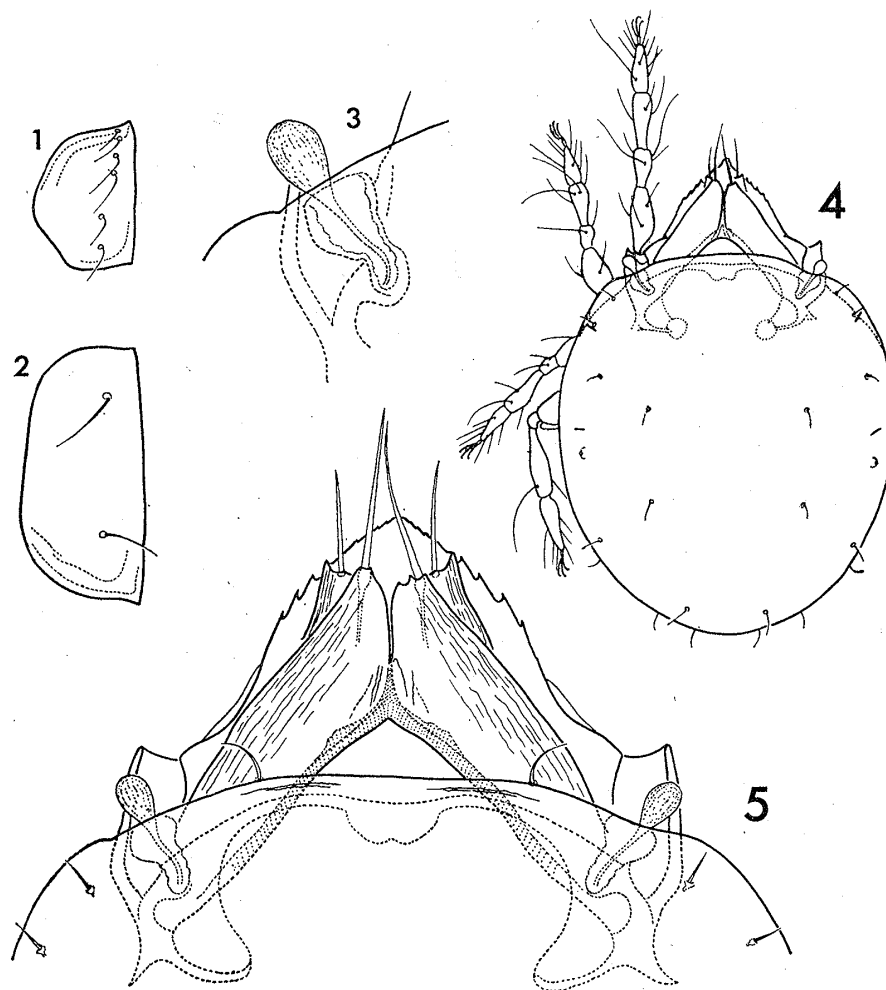
Liacarus clavatus spec. nov.

(Figs. 1–5)

Prodorsum: Rostrum provided marginally with several teeth on each side. Rostral seta relatively short, slightly roughened and inserted on the tip of longitudinal ridge which bears an outer dens. Lamellae have broad cusps which are very close to each other and leave a narrow slit between them; in the single specimen examined, the right cusp bears two small teeth, while the left one is toothless. Surface of lamella finely striated in longitudinal direction. Lamellar seta longer and thicker than rostral seta. Interlamellar seta far shorter than rostral one, curving outward and sharply pointed at tip. Sensillus very short and club-shaped, its peduncle completely hidden under the anterior part of notogaster.

Notogaster: Oval, broadly rounded posteriorly and nearly straight on the anterior margin. Humeral projection rather distinct in comparison with the other species of *Liacarus*. Ten pairs of short, fine setae arranged as in Fig. 4. Notogastral fissure *ia* located just behind the posterior humeral seta; *im* situated a short distance anterior to lateroabdominal gland opening.

Ventral side: Genital aperture hexagonal, wider than long; each genital plate



Figs. 1–5. *Li acarus clavatus* spec. nov. Fig. 1. Genital plate. Fig. 2. Anal plate. Fig. 3. Sensillus and bothridium. Fig. 4. Dorsal view. Fig. 5. Prodorsum and the anterior portion of notogaster.

bears fine, long setae; their distances are as follows: $g_2-g_3 > g_1-g_2 > g_3-g_4 > g_4-g_5 > g_5-g_6$. Aggenital setae located a little closer to genital aperture than to anal one; their mutual distance slightly shorter than width of genital aperture. Anal aperture wider posteriorly than anteriorly; anal plate has two fine, long setae which are half as long as, or a little longer than, the distance an_1-an_2 . Three pairs of adnal setae almost equal in length and in thickness to anal setae; $ad_3-ad_3 > ad_2-ad_2 > ad_1-ad_1$. Adanal fissures aligned transversely, being situated on the level of anterior anal margin. Apodemata II, SJ and III nearly horizontal, crossing sternal ridge at right angles. Setal formula of epimerata: 3—1—3—3; epimeral setae of b- and c-series seem to be longer and thicker than those of a-series.

Material examined: Holotype (NSMT-Ac-12): Glenh's spruce forest near

Obihiro, 10-XI-1968, T. Fujikawa leg. Deposited in National Science Museum, Tokyo.

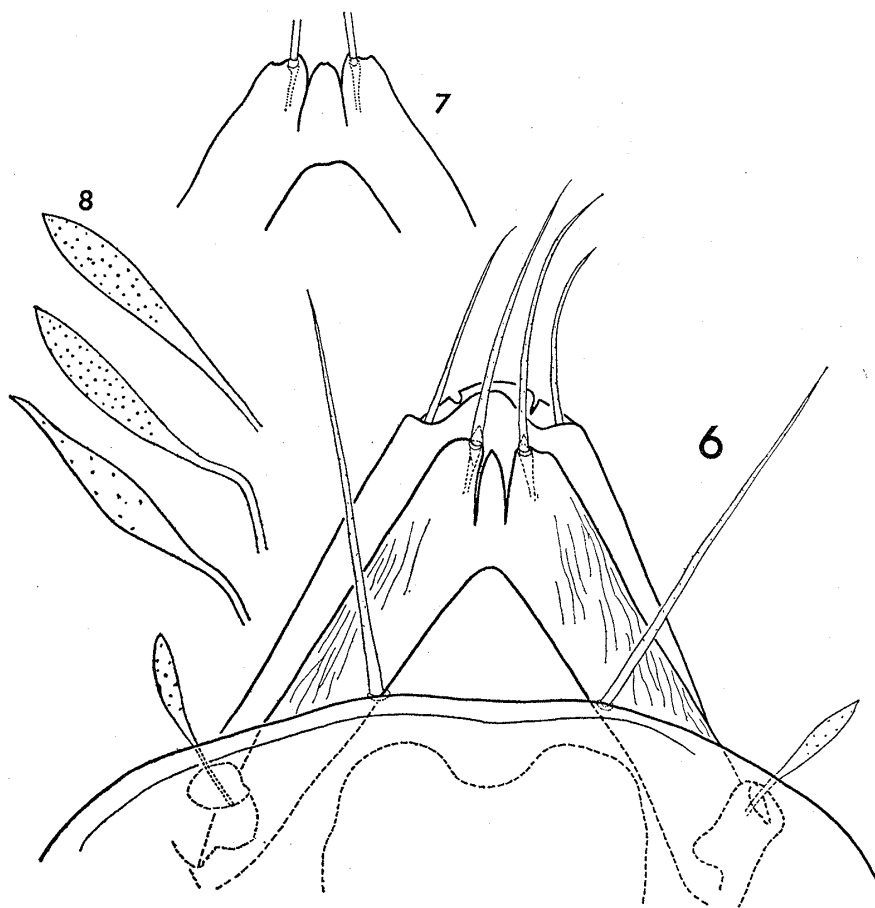
Measurement: Length: 570 μ ; width: 390 μ .

Remarks: The present new species is clearly distinguishable from other species by (1) short, clavate sensilli, (2) dentate rostral margins, (3) short interlamellar setae, and (4) broad lamellar cusps without mucro between them.

Liacarus yezoensis spec. nov.

(Figs. 6-8)

Prodorsum: Rostrum with two anterior notches (Fig. 6). Rostral setae longer than their mutual distance. Lamellae about 5/6 as long as propodosoma; lamellar cusp with a small inner dens located beneath lamellar seta; outer dens absent, but some individuals have an inconspicuous lateral angulation (Fig. 7).



Figs. 6-8. *Liacarus yezoensis* spec. nov. Fig. 6. Prodorsum and the anterior portion of notogaster. Fig. 7. Lamellae of a specimen different from that shown in Fig. 6. Fig. 8. Sensilli.

Translamella with a stout, median mucro (anterior projection) which does not extend beyond tips of lamellar cusps; the mucro somewhat variable in its breadth, being $1/2 \sim 2/3 \times$ as wide as lamellar cusp. Rostral, lamellar and interlamellar setae weakly roughened, the ratio in length being about 1.0: 1.3: 1.9. Insertion of interlamellar seta situated almost at the cross-way of medial edge of lamella and anterior margin of notogaster. Sensillus lanceolate, but sometimes clavate in appearance; the swollen portion weakly roughened (Fig. 8).

Hysterosoma: Elongate oval and brown-coloured, with eleven pairs of setae or setal pores.

Ventral side: Anal plate provided with two anal setae well spaced. Three pairs of adanal setae shorter than anal setae; distances $ad_1-ad_1 > ad_1-ad_2 = ad_2-ad_3$. Ananal fissures located at level of anterior margin of anal aperture. Aggenital setae as long as genital setae. Genital aperture separated from anal aperture by nearly 1.6 times the length of anal opening. The genital plate normally has five setae, but one specimen has six on the right and five on the left plate, and five specimens have six on both plates. In the specimens examined the setal formula of the epimerata is shown as 3—1—3—2. Each tarsus is provided with three claws.

Material examined: Holotype (NSMT-Ac-10) and 30 paratypes: Glehn's spruce forests near Obihiro, 9~11-XI-1968, T. Fujikawa leg. The type will be deposited in National Science Museum, Tokyo.

Measurement: Length: 814 (953) 1014 μ ; width: 529 (576) 614 μ .

Remarks: The present species is closely related to *Liacarus acutidens* Aoki, 1965, which differs from the former by the longer prominent mucro between the lamellae.

Liacarus acutidens Aoki

(Figs. 9–10)

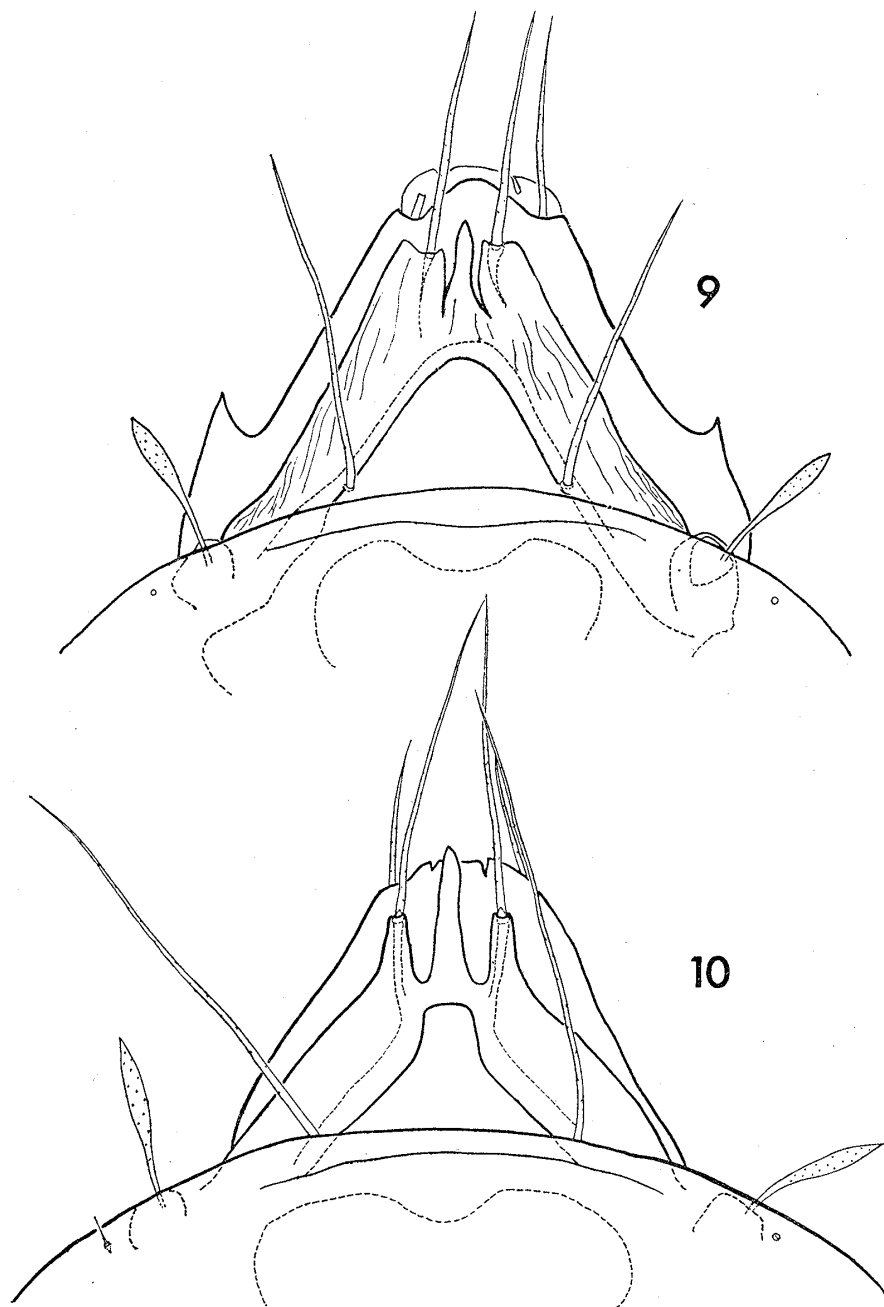
Liacarus acutidens Aoki, 1965, Jap. J. Zool. 14: 1, fig. 1.

This species has been known only from Sado Island, the type-locality. Most specimens of Hokkaido (Fig. 9) have lamellar cusps broader than those of Sado, excepting for 1 specimen from Higashi-Misumai (Fig. 10). The tip of lamellar cusp has no distinct dens in most of specimens from Hokkaido, while it has distinct outer dens in the specimens from Sado. A ventral dens is found on the cusp only in a single example from Higashi-Misumai.

The genital aperture has five pairs of setae in five specimens and six pairs in one specimen. The setal formula of epimerata is shown as 3—1—3—2.

Material examined: 1 ex., Higashi-Misumai near Sapporo, 25-VII-1968; 4 exs., Glenh's spruce forests near Obihiro, 9~10-XI-1968; 2 exs., Higashi-Misumai, 7-VIII-1969 and 22-IX-1969, T. Fujikawa leg.

Measurement: Length: 857 (952) 1057 μ ; width: 543 (586) 643 μ .



Figs. 9–10. *Liacarus acutidens* Aoki. Prodorsum and the anterior portion of notogaster.
Fig. 9. Specimen from Glehn's spruce forest. Fig. 10. Specimen from Higashi-Misumai.

Liacarus contiguus Aoki
(Figs. 11–12)

Liacarus contiguus: Aoki, 1969, Bull. Nat. Sci. Mus. Tokyo, 12: 126, figs. 20–25.

This species has also been known only from its type locality, Mt. Shiga, Nagano Prefecture. Having examined a lot of specimens from Hokkaido, we have found that they are variable in number of setae on genital and anal apertures. Anal plate has normally two setae, but two specimens have exceptionally only one or three setae on the right anal plate. The number of genital setae is more or less variable as shown in Table 1.

Table 1
Number of genital setae of *Liacarus contiguus* Aoki
from Hokkaido

Number of genital setae		Number of specimens
Left	Right	
3	3	1
4	3	1
4	4	27
5	4	3
4	5	2
5	5	39
6	6	1

In the specimens examined the setal formula of epimerata is 3—1—3—2.

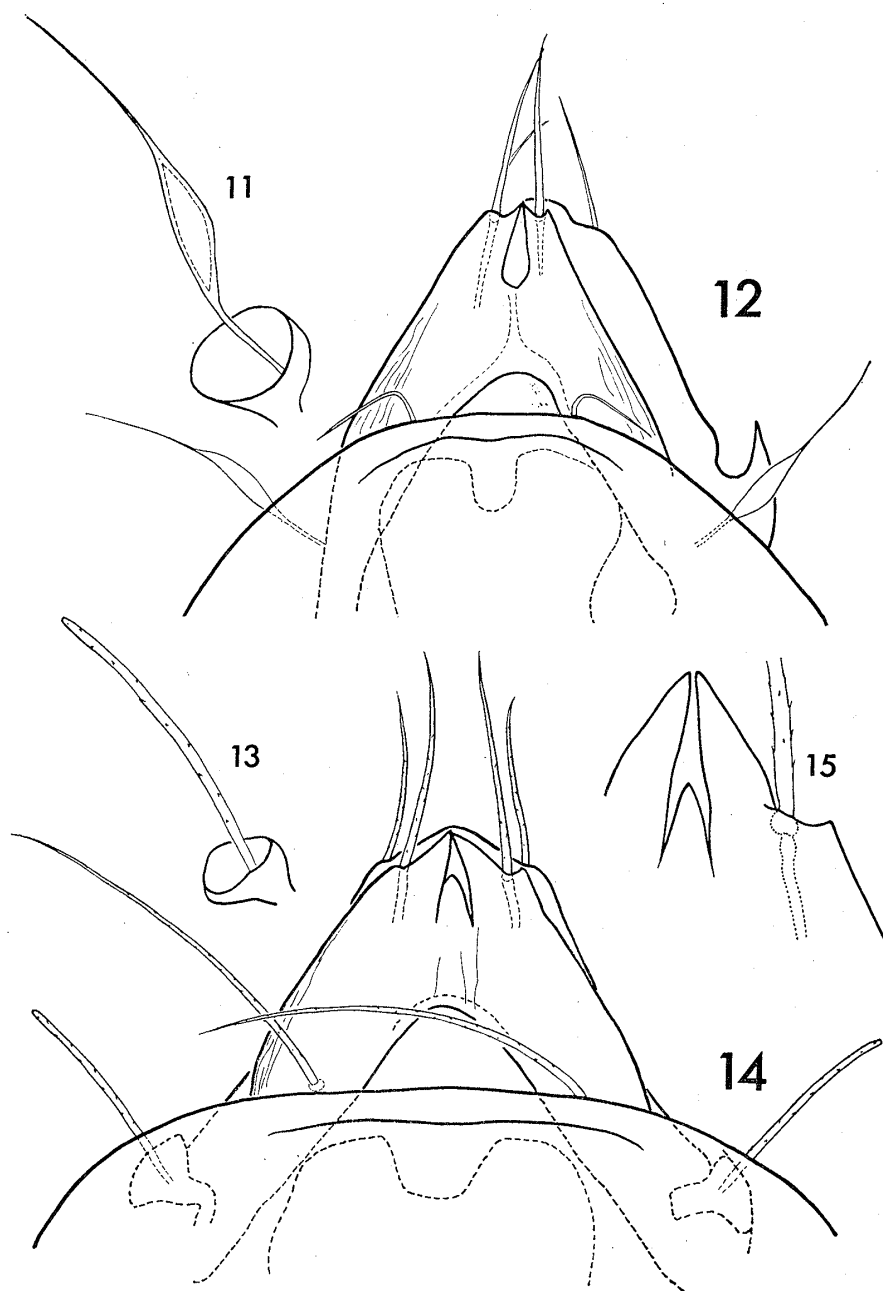
Material examined: 21 exs., Higashi-Misumai near Sapporo, 20~21-V-1968; 13 exs., Higashi-Misumai, 25~31-VII-1968; 28 exs., Higashi-Misumai, 23~31-IX-1968; 16 exs., Glenh's spruce forests near Obihiro, 9~11-XI-1968; 4 exs., Beech forest in Kuromatsunai, 25-XI-1968; 13 exs., Hiba Arbor-vitae forest in Kita-Hiyama, 28-XI-1968; 4 exs., Beech forest in Kikonai, 29-XI-1968; 3 exs., Higashi-Misumai, 17~21-I-1969; 13 exs., Higashi-Misumai, 6~8-VIII-1969; 1 ex., Abies forest in Oketo, 16-IX-1969; 13 exs., Higashi-Misumai, 22~23-XI-1969. T. Fujikawa leg.

Measurement: Length: 529 (603) 714 μ ; width: 286 (345) 400 μ .

Liacarus bacillatus spec. nov.

(Figs. 13-15)

Prodorsum: Prodorsum covered by broad lamellae. The fused portion of lamellae subequal to, or shorter than, lamellar cusp. Each lamellar cup has a large, blade-like inner dens, the tip of which is almost in contact with the opposite one. Median mucro between cusps short, about half as long as lamellar cusp. Rostral, lamellar and interlamellar setae minutely barbed, the ratio in length being about 2: 3: 5; lamellar seta nearly twice as long as free cusp of lamellar seta nearly twice as long as free cusp of lamella. Insertions of interlamellar setae situated nearly on the anterior margin of notogaster. Sensillus bacilliform, equal in thickness and weakly roughened throughout its length.



Figs. 11–12. *Liacarus contiguus* Aoki. Fig. 11. Sensillus. Fig. 12. Prodorsum and the anterior portion of notogaster.

Figs. 13–15. *Liacarus bacillatus* spec. nov. Fig. 13. Sensillus. Fig. 14. Prodorsum and the anterior portion of notogaster. Fig. 15. Lamellar cusps of a specimen different from that shown in Fig. 14.

Hysterosoma: Elongate oval and light brown-coloured; there seem to be eight pairs of setal pores and a pair of distinct setae at the posterior end of notogaster. The anterior margin nearly straight.

Ventral side: Anal plate provided with two anal setae well spaced. Three pairs of adanal setae as long as anal ones; distances $ad_1-ad_1 > ad_1-ad_2 > ad_2-ad_3$. Adanal fissures located nearly at level of anal setae an_2 . Aggential setae as long as genital setae. Genital aperture separated from anal opening. The genital aperture has four pairs of setae in one specimen, but it has five or six pairs in four specimens. The setal formula of the epimerata is shown as 3—1—3—2. Each tarsus provided with three claws.

Material examined: Holotype (NSMT-Ac-11) and five paratypes: Glehn's spruce forests near Obihiro, 9-XI-1968, T. Fujikawa leg. The type will be deposited in National Science Museum, Tokyo.

Measurement: Length: 1157 (1179) 1200 μ : width; 657 (664) 671 μ .

Remarks: The new species is readily distinguishable from the other members of the genus by the baciliform sensilli and the characteristic shape of lamellar cusps.

LITERATURE

- Aoki, J., 1965. Jap. J. Zool., **14**, 1.
———, 1969. Bull. Nat. Sci. Mus. Tokyo, **12**, 117.